

Claims

What is claimed is:

1. A bearing assembly for a rotor, the assembly comprising a cage surrounding the rotor, and a housing surrounding the cage, a first portion of the radial outer surface of the cage extending in a slightly spaced relation to the corresponding portion of the inner surface of the housing, and a second portion of the radial outer surface of the cage projecting from the first portion in a radial direction and engaging the corresponding portion of the inner surface of the housing.
2. The assembly of claim 1 wherein the cage and the housing are annular.
3. The assembly of claim 1 wherein at least one axially-extending groove is formed in the cage to form a cantilevered portion extending between the groove and the corresponding outer radial surface of the cage.
4. The assembly of claim 3 wherein the cantilevered portion forms a mechanical spring.
5. The assembly of claim 1 wherein at least one axially-extending groove is formed in the housing to form a cantilevered portion extending between the groove and the corresponding inner radial surface of the housing.
6. The assembly of claim 5 wherein the cantilevered portion forms a mechanical spring.
7. The assembly of claim 1 wherein a clearance is formed between the first portion of the radial outer surface of the cage and the corresponding portion of the inner

surface of the housing, and further comprising a passage formed in the housing for introducing oil to the clearance.

8. The assembly of claim 7 further comprising a recess formed in the cage and a passage extending through the cage and to the recess, the latter passage receiving the oil from the clearance and passing it to the recess, and further comprising tilt pads disposed in the recess.

9. The assembly of claim 7 wherein the second portion of the radial outer surface of the cage is disposed at the respective axial end portions of the cage to prevent the leakage of oil from the clearance.

10. The assembly of claim 1 wherein the second portion of the radial outer surface of the cage is disposed at the respective axial end portions of the cage.

11. A method of positioning a bearing cage and a bearing housing around a rotating member, the method comprising disposing the cage around the rotor, and disposing the housing around the cage, with a first portion of the radial outer surface of the cage extending in a slightly spaced relation to the corresponding portion of the inner surface of the housing, and with a second portion of the radial outer surface of the cage projecting from the first portion in a radial direction and engaging the corresponding portion of the inner surface of the housing.

12. The method of claim 11 wherein the cage and the housing are annular.

13. The method of claim 11 further comprising forming at least one axially-extending groove in the cage to form a cantilevered portion extending between the groove and the corresponding outer radial surface of the cage.

14. The method of claim 13 wherein the cantilevered portion forms a mechanical spring.

15. The method of claim 11 further comprising forming at least one axially-extending groove in the housing to form a cantilevered portion extending between the groove and the corresponding inner radial surface of the housing.

16. The method of claim 15 wherein the cantilevered portion forms a mechanical spring.

17. The method of claim 11 wherein a clearance is formed between the first portion of the radial outer surface of the cage and the corresponding portion of the inner surface of the housing, and further comprising a passage formed in the housing for introducing oil to the clearance.

18. The method of claim 17 further comprising forming a recess formed in the cage and forming a passage extending through the cage and to the recess, the latter passage receiving the oil from the clearance and passing it to the recess, and further comprising providing a tilt pad in the recess.

19. The method of claim 17 wherein the second portion of the radial outer surface of the cage is disposed at the respective axial end portions of the cage to prevent the leakage of oil from the clearance.

20. The method of claim 11 wherein the second portion of the radial outer surface of the cage is disposed at the respective axial end portions of the cage.

21. A bearing assembly for a rotor, the assembly comprising a cage surrounding the rotor, a housing surrounding the cage, and at least one axially-

extending groove formed in the cage to form a cantilevered portion extending between the groove and a corresponding surface of the housing to form a mechanical spring.

22. The assembly of claim 21 wherein a portion of the radial outer surface of the cage extends in a slightly-spaced relation to a corresponding portion of the inner surface of the housing to form a clearance.

23. The assembly of claim 22 wherein a portion of the radial outer surface of the cage projects from the first-mentioned portion in a radial direction and engages a corresponding portion of the inner surface of the housing.

24. The assembly of claim 22 further comprising a passage formed in the housing for introducing oil to the clearance.

25. The assembly of claim 21 further comprising a tilt pad supported by the cage which engages the rotor and wherein the thickness of the cantilevered portions, and therefore the thickness of the mechanical springs, correspond to the bearing thickness of the tilt pads.

26. A bearing assembly for a rotor, the assembly comprising a cage surrounding the rotor, a housing surrounding the cage, and at least one axially-extending groove formed in the housing to form a cantilevered portion extending between the groove and the corresponding surface of the cage to form a mechanical spring.

27. The assembly of claim 25 wherein a portion of the radial outer surface of the cage extends in a slightly-spaced relation to a corresponding portion of the inner surface of the housing to form a clearance.

28. The assembly of claim 27 wherein a portion of the radial outer surface of the cage projects from the first-mentioned portion in a radial direction and engages the corresponding portion of the inner surface of the housing.

29. The assembly of claim 27 further comprising a passage formed in the housing for introducing oil to the clearance.

30. The assembly of claim 26 further comprising a tilt pad supported by the cage which engages the rotor, and wherein the thickness of the cantilevered portions, and therefore the thickness of the mechanical springs, correspond to the bearing thickness of the tilt pads.

31. A bearing assembly for a rotor, the assembly comprising a cage surrounding the rotor, and a housing surrounding the cage, at least one axially-extending groove formed in the cage to form a cantilevered portion extending between the groove and the corresponding surface of the housing to form a mechanical spring, and at least one axially-extending groove formed in the housing to form a cantilevered portion extending between the groove and the corresponding surface of the cage to form another mechanical spring.

32. The assembly of claim 31 wherein a portion of the radial outer surface of the cage extends in a slightly spaced relation to a corresponding portion of the inner surface of the housing to form a clearance.

33. The assembly of claim 32 wherein another portion of the radial outer surface of the cage projects from the first-mentioned portion in a radial direction and engages a corresponding surface of the housing.

34. The assembly of claim 32 further comprising a passage formed in the housing for introducing oil to the clearance.

35. The assembly of claim 31 wherein the cage and the housing are annular.

36. A method of manufacturing a bearing assembly comprising providing a rotor, surrounding the rotor with a cage, surrounding the cage with a housing, forming at least one axially-extending groove formed in the cage to form a cantilevered portion extending between the groove and the corresponding surface of the housing to form a mechanical spring, and forming at least one axially-extending groove formed in the housing to form a cantilevered portion extending between the groove and the corresponding surface of the cage to form another mechanical spring.

37. The method of claim 36 wherein a portion of the radial outer surface of the cage extends in a slightly spaced relation to a corresponding portion of the inner surface of the housing to form a clearance.

38. The method of claim 37 wherein another portion of the radial outer surface of the cage projects from the first-mentioned portion a radial direction and engages a corresponding surface of the housing.

39. The method of claim 37 further comprising introducing oil to the clearance.

40. The method of claim 36 further comprising providing a tilt pad in the cage which engages the rotor, and adjusting the thickness of the cantilevered portions, and therefore the thickness of the mechanical springs, relative to the bearing thickness of the tilt pads.